MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2017/2018

TOS1141 – OPERATING SYSTEMS

(All sections / Groups)

27 OCTOBER 2017
3.00 p.m. – 5.00 p.m.
(2 hours)

INSTRUCTIONS TO STUDENTS

1. This Question paper consists of 4 pages including cover page with 5 Questions only.

2. Attempt **ALL** questions. All questions carry equal marks and the distribution of the marks for each question is given.

3. Please print all your answers in the Answer Booklet provided.

QUESTION 1

(a) CPU scheduling decision can be generally categorized into preemptive and non-preemptive scheduling. Differentiate the two scheduling decision categories, then discriminate the **FOUR (4)** scheduling decision points in terms of the preemptive and non-preemptive scheduling. [6 marks]

(b) Consider the following four processes, with the length of the CPU-burst time and arrival time given in milliseconds.

Process	Arrival Time	Burst time
P1	0	6
P2	2	3
P3	3	7
P4	4	***

Given the total burst time for all processes is 20, calculate the burst time for P4 and calculate the average turnaround time for each process using the followings:

i. Preemptive shortest job first scheduling algorithm
ii. Round robin scheduling algorithm using a time slice of 1 millisecond

[2 x 3 marks = 6 marks]

QUESTION 2

(a) Distinguish policy from mechanism from the OS design perspective. Why is it important to separate policy from mechanism? [4 marks]

(b) Differentiate I/O bound and CPU bound processes. Why do we need to balance I/O bound processes and CPU bound processes in a multiprogramming system? [4 marks]

(c) Describe the mechanisms of operation of a virtual machine. Identify **TWO (2)** possible reasons for why a virtual machine is useful. [4 marks]

Continued ....

QUESTION 3

(a) Define the following terms:

i. Process
ii. Kernel
iii. Trap
iv. Secondary storage
v. Dual mode operation
vi. Cache coherency [6 x 1 mark = 6 marks]

(b) Explain **THREE (3)** characteristics of timesharing OS structure. [3 marks]

(c) What are **THREE (3)** methods of passing parameters to the OS during system calls? [3 marks]

QUESTION 4

(a) Discuss **THREE (3)** methods used to solve the problem of deadlocks. [6 marks]

(b) At an instant, the resource allocation state in a system is as follows:

5 processes: P1 – P5
4 resource types: R1 – R4

- R1 (6 instances)
- R2 (3 instances)
- R3 (4 instances)
- R4 (3 instances)

Snapshot at the initial time stage:

Process	Allocation				Max			
	R1	R2	R3	R4	R1	R2	R3	R4
P_1	3	0	1	1	6	2	1	1
P_2	0	1	0	0	0	2	1	2
P_3	1	1	1	0	2	1	1	0
P_4	1	1	0	1	1	1	1	1
P_5	0	0	0	0	2	1	1	1

i. Compute the Available vector. [1 mark]

ii. Compute the Need Matrix. [1 mark]

iii. Is the current allocation state safe? If so, give a safe sequence of the process. In addition, show how the Available (working array) changes as each process terminates. [3 marks]

iv. If the additional request (1, 1, 0, 0) from P1 arrives, will it be correct to grant the request? Justify your decision. [1 mark]

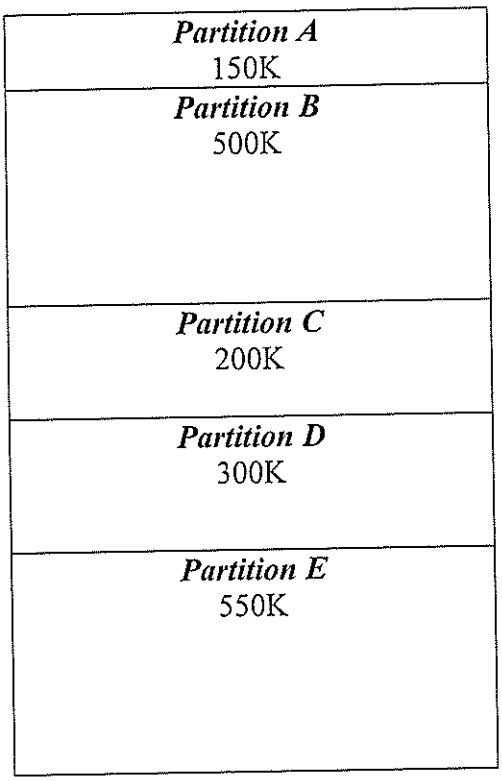
Continued ....

QUESTION 5

(a) Differentiate between a page and a segment. [2 marks]

(b) In a fixed partitioning scheme, the adjacent memory partitions are as the figure below. Illustrate the allocations for the FIRST-FIT and the BEST-FIT algorithms, if 4 processes (P1 – P4) requiring memories in the following order:

i. P1 – 210K
ii. P2 – 450K
iii. P3 – 135K
iv. P4 – 425K



[4 x 1 mark = 4 marks]

(c) An allocation method refers to how disk blocks are allocated for files. Compare the **THREE (3)** file allocation methods in term of their advantage. [3 marks]

(d) The operating system is responsible for using the disk drives efficiently, this means having a fast access time and large disk bandwidth. Explain any **THREE (3)** algorithms used for disk scheduling. [3 marks]

End of Paper.